



Brüel & Kjær Vibro



Brüel & Kjær Vibro

Improving Industrial Machine Uptime



Tackling today's maintenance challenges ...

The profitability and competitive edge of a plant is inextricably linked to the operation and maintenance optimisation of the production machine assets.

Is this a challenge in your company?

In the past, machines and machine components were over-designed and operated at constant loads. Life cycle times were easily predictable and a time based maintenance strategy was sufficient to remedy most faults. Additionally, a team of well-qualified operators and maintenance crew were always at hand.

Consequently, the need for machine condition monitoring was minimal!

Today's situation is a far contrast to that of the past. Lean computer-designed machines are operating ever closer to their limits, and the need for production flexibility leads to widely variable operating conditions and machine loads. The result is an increase in the number of potential failure modes and a very broad mean time to failure of the machine components.

Furthermore, the ever increasing cost of feedstock and fuel for the machines demand optimal operational efficiency. And where are the qualified maintenance crew? There has been a significant reduction in the knowledge base and expertise within companies as a result of downsizing, and remote operations.

These elements combine to make a condition and performance monitoring strategy not only viable, but indispensable.

**... requires
a partner
that adds value**

Brüel & Kjær Vibro is the world's leading independent supplier of protective/safety monitoring, and knowledge-based condition and performance monitoring solutions for rotating machinery. Our solutions, incorporating a wide product range and global service organisation, are tailored to maximize safety, plant utilization and operational effectiveness,

while minimizing unplanned outages and maintenance costs.

We have been providing effective monitoring solutions longer than anyone else, and this is all we do.

More than a company that supplies effective monitoring solutions, we are a partner in your business.



Our solutions

State-of-the-art products

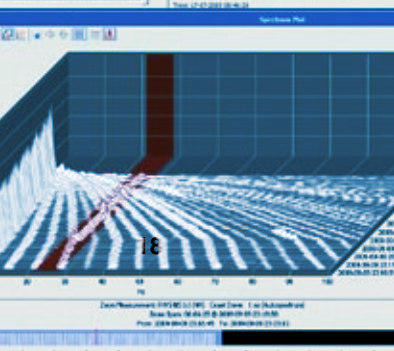
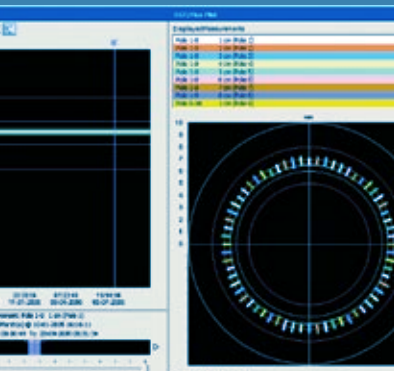
Brüel & Kjær Vibro offers a full range of monitoring solutions ranging from sensors and accessories to plant-wide monitoring systems.

Our equipment is designed to the highest industrial standards of quality and integrity. With a name for reliability, many of our systems are still in service more than 20 years after initial commissioning.

- Design and development of the first commercially available piezoelectric accelerometers
- World's first balancing machines
- First to integrate portable data collectors with an on-line condition monitoring system
- First to include profile type alarm limits on FFT and envelope spectrum measurements
- Development of advanced techniques required for rolling element bearing and gearbox fault detection and analysis including: Constant Percentage Bandwidth (CPB), Selective Envelope Detection (SED) and cepstra measurements

Some of the **initiatives** that we have introduced over the years

- First to use digital signal processing in condition monitoring systems
- First to develop and use neural networks in a commercially available machine diagnosis system (ADVISOR)
- First to include performance monitoring as part of an integrated condition monitoring system
- DDAU - First dedicated wind turbine condition monitoring system
- First in providing remote diagnostic services and actionable information to both OEMs and end-users



Innovative project delivery and services

Project management is an inherent requirement in turnkey solutions. With the increasing tendency towards larger and more complex projects, the demand for effective project management is ever increasing.

Our Project Team has been implementing monitoring solutions with many of the world's leading oil & gas, petrochemical and power companies and their engineering, procurement and construction contractors.

These projects include greenfield installations, brownfield expansions and retrofit projects. Owing to our extensive experience in this field, project requirements are addressed internally and form part of our standard solution offering. This includes project management, documentation, drawings, factory acceptance and site testing, system commissioning, reporting, training, ongoing services, and long-term service agreements.

Our service portfolio comprises a wide range of support services designed to address a variety of cus-

tomers needs. These services include system maintenance and upgrades, training, remote data analysis and fault detection, advanced diagnostics and service agreements. All of this can be tailored to meet specific customer requirements or combined in a long-term service agreement.



Company values and expertise

Being able to deliver good business value to you is based on several important building blocks; our people, experience, customer focus, technology, quality and our own business and ethical values. It is this unique combination of qualities that makes us successful.

Protecting and correctly diagnosing multi-million dollar machinery demands precision and responsibility from the monitoring system supplier. We are steered by quality assurance, from product development, testing, vendor management, sales, and

implementation to service and after sales support. The products and services that are provided comply with the relevant international and local standards, norms and certifying bodies. In fact, we are actively involved in a number of international standards organizations, including ISO, VDI, DIN amongst others.

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Company application expertise

We maintain a culture of customer focus throughout our organization. This requires intimate knowledge not only of our customers' monitoring requirements, but also of their machines and operating processes within our strategic markets. Due to the high expertise required in our application solutions, we develop and test these together with end-users, machine manufacturers, process control system suppliers, international standards organisations and other institutions. Customers are an invaluable source of information and the ongoing collaboration with selected end-users such as Shell, BASF and others, has been instrumental in both developing and optimising our application-based condition monitoring solutions. Many of our standard products are also engineered in close

collaboration with machine vendors like Howden Thomassen Compressors (formerly Thomassen Compression Systems), MAN Turbo, Siemens or Vestas.

What is the end result of this? Our application knowledge combined with our extensive experience within the fields of vibration and condition monitoring, enables Brüel & Kjær Vibro to tailor the monitoring solutions to customer-specific requirements. For this reason we can deliver comprehensive, integrated condition and performance monitoring solutions to the petrochemical, oil & gas, wind power, hydroelectric and thermal power industries. We also provide machine protection and innovative compact monitoring solutions for rotating machinery OEMs.



Analysis Safety & Condition Monitoring Performance Monitoring Diagnostics And
Monitoring Vibration Analysis Remote Diagnostics Service Field Balancing Control





We bring benefit to our customers...

With over 60 years experience in vibration monitoring, Brüel & Kjær Vibro has an installed base comprising thousands of monitoring systems world-wide. The company's strategic focus lies in the oil & gas, petrochemical and power industries, who together with their turbo machinery OEMs are supported by a global sales and service organization.

Petroleum, Oil & Gas Industries: BASF • Borealis • Chiyoda • ConocoPhillips • Doosan • Ebara Pumps • Foster Wheeler • Hitachi • JGC • Kepco • Mitsubishi Heavy Industries • M.W. Kellogg • Pertamina • Petronas • PetroVietnam • PTT • Siemens • Shell • SK Construction & Engineering • Statoil • Technip • Woodside • Yokogawa



... and this is what they say

Liane Persson, Executive Vice President Operation, Arise Windpower, Sweden:

“ We believe that using one common condition monitoring system on wind turbines [we have chosen the Brüel & Kjær Vibro DDAU system],

from all of our suppliers, regardless if it is a Vestas or GE turbine, will help us to standardize the system installation, data acquisition and diagnostic procedures, and will ultimately deliver significant benefits to Arise Windpower. ”

Harbin Turbine Company Ltd. Automation Control Company, PRC

“ We, as an OEM, had a successful cooperation with Brüel & Kjær Vibro on applying their TSI (turbine supervisory instrument) on our turbine generators of different capacity levels including 1000MW units. Based on the good feedback from end-users and technical communication with the Brüel & Kjær Vibro personnel, we deem that Brüel & Kjær Vibro products are of high quality, reliability, and appreciated by end-users. Apart from the product quality, we are also impressed by the employees' expertise and good service. ”

Windpower Generation:

Arise • Dong • Suzlon • Vestas • Vattenfall

Hydroelectric Power Generation:

ABB • Alstom • Andritz Hydro • Energy SA •

EVN • Illwerke • Salzburg AG • Verbund • Voith Hydro

Porabka Zar HPP, PGE Energia Odnawialna S.A., Poland:

“ The online Air Gap & Magnetic Flux & Vibration monitoring system known under the trademark: COMPASS (COMputerized Predictive Analysis and Safety System) has been implemented by the company Brüel & Kjær Vibro at the scheduled time and is of very high quality. (...)

The previously installed COMPASS classic system was completely upgraded to assure fully integrated solution for air gap, magnetic flux, vibration and hydraulic parameters required by us.

The service support from Brüel & Kjær Vibro was perfect considering the very short performance time (...) and therefore we have no hesitation in recommending the COMPASS system and the company Brüel & Kjær Vibro to other users. ”

Brüel & Kjær Vibro worldwide...

Brüel & Kjær Vibro is the leading worldwide independent supplier of condition monitoring solutions for rotating machinery. As a member of Spectris plc, a leading supplier of productivity-enhancing instrumentation, we are completely independent of machine manufacturers and process control system suppliers. This means our monitoring solutions are unbiased and not influenced by other corporate issues or potential conflicts of interest.

If you are looking to increase machine uptime, increase machine performance and reliability and reduce maintenance costs at your plant, contact your nearest Brüel & Kjær Vibro office to see how our monitoring solutions can help you.

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- Subsidiary or distributor

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Brüel & Kjær Vibro is a member of **Spectris plc**, a leading supplier of productivity-enhancing instrumentation.